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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/380,994	09/13/1999	MASARU TAKADA	P23128USA	3373

7590 02/19/2002

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EXAMINER

CUNEO, KAMAND

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 02/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.



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9/380994

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EXAMINER

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DATE MAILED:

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

OFFICE ACTION SUMMARY

☒ Responsive to communication(s) filed on 1/3/02

☐ This action is FINAL.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 D.C. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

- ☒ Claim(s) 1-4, 7, 10-11, 14-15, 18 is/are pending in the application.
Of the above, claim(s) _____ is/are withdrawn from consideration.
- ☒ Claim(s) 15, 18 is/are allowed.
- ☒ Claim(s) 1-4, 7, 10, 11, 14 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirements.

Application Papers

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- ☒ The proposed drawing correction, filed on 1/3/02 is ☒ approved ☐ disapproved.
- ☐ The specification is objected to by the Examiner.
- ☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
- ☐ received.
- ☐ received in Application No. (Series Code/Serial Number) _____
- ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

- ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- ☒ Notice of Reference Cited, PTO-892
- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s) _____
- ☐ Interview Summary, PTO-413
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Notice of Informal Patent Application, PTO-152

--SEE OFFICE ACTION ON THE FOLLOWING PAGES--

DETAILED ACTION

Oath/Declaration

1. The supplemental page of the declaration which contains the numbers of the last two priority documents is missing from the application. Copies of these pages were not attached to the response of 1/3/02.

Claim Objections

2. Claim 1 is objected to for the following: line 5, "layer" should be layer.

Treatment of Claims Based on Prior Art

3. 35 USC 102 includes the following sections which state:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371[©] of this title before the invention thereof by the applicant for patent.

4. Claims 1-2 are rejected under 35 USC 102(e) as anticipated by Mizumoto et al. (US 5883335, hereafter Mizumoto).

Figures 3 and 9 along with the descriptions at column 4, lines 58-63, column 5, lines 9, 19-20, 53-60 disclose a board with 5 layers of insulation interconnected by through holes. The first layer is a component connecting layer, the nth is a external layer and layer n-1 are current transmitting. The nth

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layer is covered by an outermost insulating layer with the terminals exposed. The central layer prevents warpage. The external connecting terminals are solder balls as seen in figure 3.

5. Claim 11 is rejected under 35 U.S.C. 102(b) as being anticipated by Feilchenfeld et al. (US 6006428, hereafter Feilchenfeld).

Through hole (26) in figure 1 is covered by pad (32) which has an off-set solder ball attached to it. A circuit is provided at the open end of the through hole. The pad and the circuit are connected by the film lining of the hole, column 2, line 10.

6. 35 USC 103(a) states:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Obviousness under 35 USC 103(a) is determined against a background established by the factual inquires set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), which are summarized in items 1-4 below.

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 USC 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the

contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 USC 103(c) and potential 35 USC 102(f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 3-4, 7 and 10 are rejected under 35 USC 103(a) as being unpatentable over Mizumoto.

Claim 4: Mizumoto discloses the board with the insulating layers and the conductor circuits as claimed. Mizumoto discloses the invention except for specifying that the internal insulating layers are glass cloth prepreg (glass cloth reinforced resin). Nevertheless, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to use glass cloth prepreg to form the layers of substrate (290) of Mizumoto, because use of glass cloth prepreg for this purpose is well known and old in the art. Use of this material has the benefit of high dielectric strength and good processability. Furthermore, it has been held that use of known materials based on their suitability for the intended use is within the level of ordinary skill. *In re Leshin*. 125 USPQ 416.

Claims 3, 7 and 10 claims are the method counterparts to claims 1-2 and 4, and additionally recite laminating and press bonding the conductive layers, then etching them to form a conductor pattern. Mizumoto 1 discloses a structure which teaches all of the method steps except for laminating and press bonding the conductive layers, etching them to form a conductor pattern and forming the through holes with a laser beam. Nevertheless, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to make the conductive layers with laminating, press bonding and etching to form the circuitry, and to form the through holes with a laser beam, because these manufacturing methods are well known and routine in the art.

9. Claim 14 rejected under 35 U.S.C. 103(a) as being unpatentable over Feilchenfeld, as applied to claim 11, and Glenn et al. (US 5796163, hereafter Glenn).

Lin discloses all of the claimed elements except for the solder resist. Glenn discloses resist (15) which covers the substrate and fills the hole.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to apply resist to the board of Lin as taught by Glenn for improved shearing strengths and cracking resistance, Glenn at column 2, lines 42-43.

Allowable Subject Matter

10. Claims 15 and 18 are allowed. While it is well known to form a pad at an open end of a through hole and place a solder ball thereupon, the prior art does not suggest such a configuration where a covering a pad covers the other end of the through hole and the solder ball is located on an **annular** pad. Imasu et al. (US 6208525) teaches a similar configuration including a covering pad, but was filed after the filing of the present application. Furthermore, there is no teaching in Imasu that the pad is annular.

Response to Arguments

11. Applicant's arguments are moot in view of the new grounds of rejection.

Closing

12. Any inquiries related to the examination of this application should be directed to Ex. K. Cuneo at (703) 308-1233 or her supervisor Ex. J Gaffin at (703) 308-3301. Inquiries of a general nature should be directed to the receptionist of Group 2800 at (703) 308-0956. The fax numbers for Group 2800 are (703) 305-7722 and 7724.



K. Cuneo

Patent Examiner Group 2841

February 9, 2002